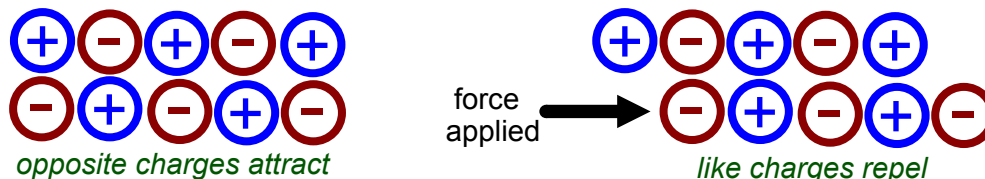


Assignment 8.2

#14, 18, 41, 43, 47, 51

- 14) i. Electrical conductivity requires the charged particles to move freely. As an ionic solid, the electrons are locked up. In solution, or molten, the charge particles move around and thus can conduct electricity.
- ii. Ionic solids have very high melting and boiling points because of the very strong attraction between positive and negative ions.
- iii. In a crystal lattice, cations are surrounded by anions, and visa versa. If disrupted, these ions move next to ions of the same charge. This causes repulsion, which causes it to break.



- iv. Many ionic solids are soluble in polar solvents like water because the ions can be surrounded by oppositely charged poles.
18. Once a metal has lost its valence electrons, the ionization energy needed to remove the core electrons is greater than the increased lattice energy. Once a nonmetal has filled its valence shell, the energy required to begin a new energy level is greater than the increased lattice energy.
- 41) a. Al_2S_3 - aluminum sulfide c. MgCl_2 - magnesium chloride
b. K_3N - potassium nitride d. CsBr - cesium bromide
- 43) Lattice energy is proportional to Q_1Q_2/r .
 Q_1 and Q_2 are the charges of the ions and r is the distance between ions.
An ion with a charge of $2+$ has exactly double the lattice energy as $1+$.
Larger ions have weaker lattice energy because the charges are farther apart.
- a. NaCl has greater L.E. because Na^+ is smaller than K^+ .
b. LiF has greater L.E. because F^- is smaller than Cl^- .
c. MgO because O^{2-} has a greater charge than OH^- .
d. $\text{Fe}(\text{OH})_3$ because Fe^{3+} has a greater charge than Fe^{2+} .
e. Na_2O because O^{2-} has a greater charge and is smaller than Cl^- .
f. MgO because Mg^{2+} and O^{2-} are smaller than Ba^{2+} and S^{2-} .
- 47) Removing a second electron from Magnesium and adding a second electron to oxygen both require energy, but the increased lattice energy of the $2+$ and $2-$ ions more than makes up for it.
- 51) Ca^{2+} has greater lattice energies than Na^+ because it has double the charge.
 Se^{2-} has greater lattice energies than Te^{2-} because it is smaller.

CaTe has greater lattice energy than Na_2Se because the difference in charges is much more important than the difference in sizes.